

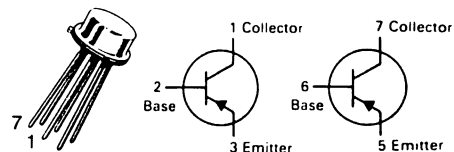


SOLID STATE INC.

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**2N3806 thru
2N3810,A
2N3811,A**



2N3810, 2N3811

**DUAL
AMPLIFIER TRANSISTOR**

PNP SILICON

MAXIMUM RATINGS

Rating	Symbol	Value		Unit
Collector-Emitter Voltage	V_{CEO}	60		Vdc
Collector-Base Voltage	V_{CBO}	60		Vdc
Emitter-Base Voltage	V_{EBO}	5.0		Vdc
Collector Current — Continuous	I_C	50		mAdc
		One Die	Both Die	
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	500 2.86	600 3.43	mW mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	- 65 to + 200		$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage(1) ($I_C = 10 \text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	60	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 10 \text{ }\mu\text{Adc}$, $I_E = 0$)	$V_{(BR)CBO}$	60	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \text{ }\mu\text{Adc}$, $I_C = 0$)	$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current ($V_{CB} = 50 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 50 \text{ Vdc}$, $I_E = 0$, $T_A = 150^\circ\text{C}$)	I_{CBO}	— —	0.01 10	μAdc
Emitter Cutoff Current ($V_{BE} = 4.0 \text{ Vdc}$, $I_C = 0$)	I_{EBO}	—	20	nAdc
ON CHARACTERISTICS				
DC Current Gain(1) ($I_C = 1.0 \text{ }\mu\text{Adc}$, $V_{CE} = 5.0 \text{ Vdc}$) ($I_C = 10 \text{ }\mu\text{Adc}$, $V_{CE} = 5.0 \text{ Vdc}$) ($I_C = 100 \text{ }\mu\text{Adc}$, $V_{CE} = 5.0 \text{ Vdc}$) ($I_C = 100 \text{ }\mu\text{Adc}$, $V_{CE} = 5.0 \text{ Vdc}$, $T_A = -55^\circ\text{C}$) ($I_C = 500 \text{ }\mu\text{Adc}$, $V_{CE} = 5.0 \text{ Vdc}$) ($I_C = 1.0 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$) ($I_C = 10 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE} <			

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ELECTRICAL CHARACTERISTICS (continued) ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
Base-Emitter On Voltage ($I_C = 100\ \mu\text{A}$, $V_{CE} = 5.0\ \text{Vdc}$)	$V_{BE(on)}$	—	0.7	Vdc

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ($I_C = 500\ \mu\text{A}$, $V_{CE} = 5.0\ \text{Vdc}$, $f = 30\ \text{MHz}$) ($I_C = 1.0\ \text{mA}$, $V_{CE} = 5.0\ \text{Vdc}$, $f = 100\ \text{MHz}$)	f_T	30 100	— 500	MHz
Output Capacitance ($V_{CB} = 5.0\ \text{Vdc}$, $I_E = 0$, $f = 100\ \text{kHz}$)	C_{obo}	—	4.0	pF
Input Capacitance ($V_{BE} = 0.5\ \text{Vdc}$, $I_C = 0$, $f = 100\ \text{kHz}$)	C_{ibo}	—	8.0	pF
Input Impedance ($I_C = 1.0\ \text{mA}$, $V_{CE} = 10\ \text{Vdc}$, $f = 1.0\ \text{kHz}$)	h_{ie}	3.0 10	30 40	$k\Omega$
Voltage Feedback Ratio ($I_C = 1.0\ \text{mA}$, $V_{CE} = 10\ \text{Vdc}$, $f = 1.0\ \text{kHz}$)	h_{re}	—	25	$\times 10^{-4}$
Small-Signal Current Gain ($I_C = 1.0\ \text{mA}$, $V_{CE} = 10\ \text{Vdc}$, $f = 1.0\ \text{kHz}$)	h_{fe}	150 300	600 900	—
Output Admittance ($I_C = 1.0\ \text{mA}$, $V_{CE} = 10\ \text{Vdc}$, $f = 1.0\ \text{kHz}$)	h_{oe}	5.0	60	μmhos
Noise Figure ($I_C = 100\ \mu\text{A}$, $V_{CE} = 10\ \text{Vdc}$, $R_G = 3.0\ \text{kohms}$ $f = 100\ \text{Hz}$, $BW = 20\ \text{Hz}$)	NF	—	7.0	dB
		—	4.0	
Spot Noise $f = 1.0\ \text{kHz}$, $BW = 200\ \text{Hz}$		—	3.0	
		—	1.5	
$f = 10\ \text{kHz}$, $BW = 2.0\ \text{kHz}$		—	2.5	
		—	1.5	
Broadband Noise Bandwidth 10 Hz to 15.7 kHz		—	3.5	
		—	2.5	

MATCHING CHARACTERISTICS

DC Current Gain Ratio(2) ($I_C = 100\ \mu\text{A}$, $V_{CE} = 5.0\ \text{Vdc}$)	h_{FE1}/h_{FE2}	0.8 0.9 0.95	1.0 1.0 1.0	—
($I_C = 100\ \mu\text{A}$, $V_{CE} = 50\ \text{Vdc}$, $T_A = -55\ \text{to} +125^\circ\text{C}$)		0.85	1.0	
Base-Emitter Voltage Differential ($I_C = 10\ \mu\text{A}$ to $10\ \text{mA}$, $V_{CE} = 5.0\ \text{Vdc}$)	$ V_{BE1} - V_{BE2} $	— —	8.0 5.0	mVdc
($I_C = 100\ \mu\text{A}$, $V_{CE} = 5.0\ \text{Vdc}$)		— — —	5.0 3.0 1.5	
Base-Emitter Voltage Differential Change Due to Temperature ($I_C = 100\ \mu\text{A}$, $V_{CE} = 5.0\ \text{Vdc}$, $T_A = -55\ \text{to} +25^\circ\text{C}$)	$\Delta(V_{BE1} - V_{BE2})$	— — —	1.6 0.8 0.4	mVdc
($I_C = 100\ \mu\text{A}$, $V_{CE} = 5.0\ \text{Vdc}$, $T_A = +25\ \text{to} +125^\circ\text{C}$)		— — —	2.0 1.0 0.5	

(1) Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

(2) The lowest h_{FE} reading is taken as h_{FE1} for this ratio.

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FIGURE 1 — DC CURRENT GAIN versus COLLECTOR CURRENT

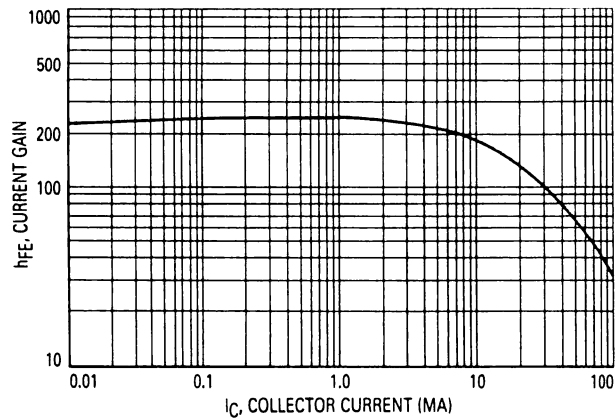


FIGURE 2 — DC CURRENT GAIN versus COLLECTOR CURRENT

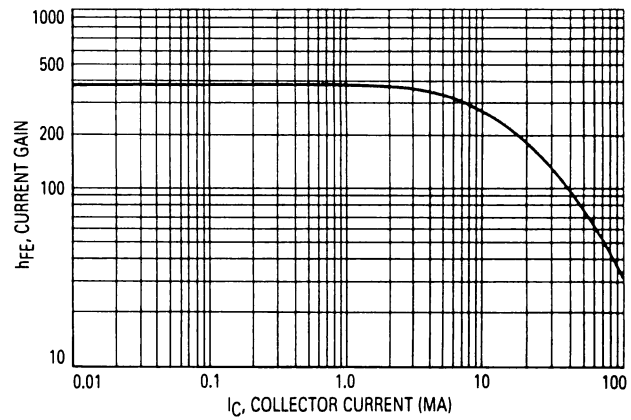


FIGURE 3 — "ON" VOLTAGES

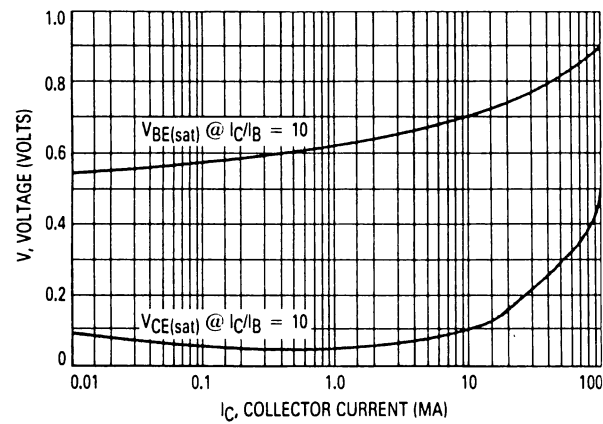
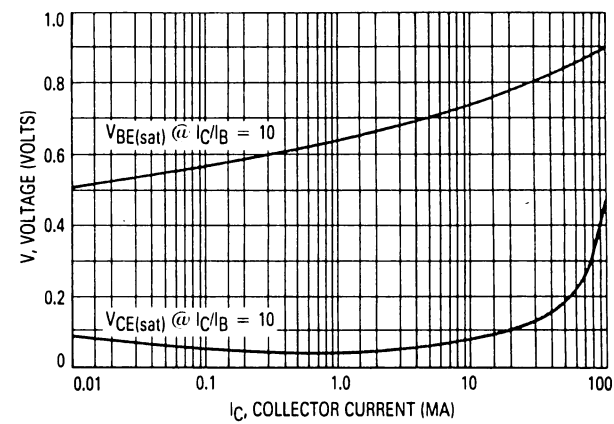
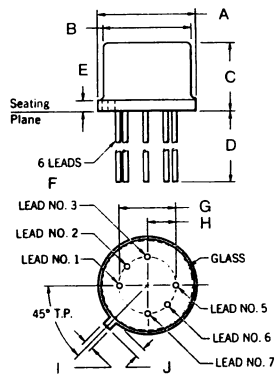


FIGURE 4 — "ON" VOLTAGES



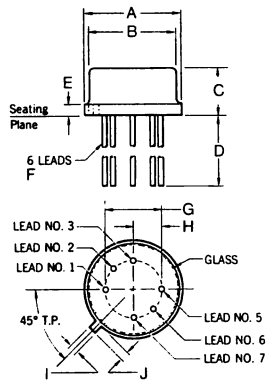
PHYSICAL DIMENSIONS

JEDEC (TO-77) outline



DIM.	INCHES			MILLIMETERS		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	.335		.370	8.51		9.39
B	.305		.335	7.75		8.51
C	.240		.260	6.10		6.60
D	.500			12.70		
E			.040			0.916
F	.016		.019	0.406		0.483
G		.200			5.08	
H		.100			2.54	
I	.028		.034	0.711		0.864
J	.029		.045	0.737		1.14

JEDEC (TO-78) outline



DIM.	INCHES			MILLIMETERS		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	.335		.370	8.51		9.39
B	.305		.335	7.75		8.51
C	.165		.185	4.19		4.69
D	.500			12.70		
E			.040			0.916
F	.016		.019	0.406		0.483
G		.200			5.08	
H		.100			2.54	
I	.028		.034	0.711		0.864
J	.029		.045	0.737		1.14